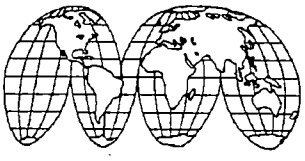
PROGRAM & ABSTRACTS



FIRST INTERNATIONAL WORKSHOP ON ORAL MALODOR

Under the auspices of the **Sackler Faculty of Medicine,**

TEL AVIV UNIVERSITY אוניברסיטת תל-אביב

Financial support provided by **Warner-Lambert Co.**

First International Workshop on Oral Malodor
Daniel Hotel, Herzliya Tel: 052-544444
PROGRAM

Monday, April 26th, 1993

18:00-22:00 Registration, punch & hors d'oeuvres, cash bar, and live music by the Bad Breath Band, in the **Cleopatra Lounge**

Tuesday, April 27th, 1993

06:30-8:30 Breakfast
08:30-09:00 Registration and Lectures, **Diplomat Ambassador Room**
09:00-09:15 Introduction to Meeting (**M. Rosenberg**)
09:15-11:00 **Session I: Measurement of Oral Malodor**
Chairperson: **J. Gabbay**
09:15-10:00
W. S. Cain: "Human Assessment of Odor Mixtures"
10:00-10:30
H.P. Niles: "A Review of Advances in Mouth Odor Research"
10:30-11:00
M. Shaw: "Instrumental Measurement of Oral Malodor"
11:00-11:15
Discussion
11:15-11:45 Coffee Break

Session II: Biological Aspects of Oral Malodor Production
Chairperson: **S. Dills**
11:45-12:15
I. Kleinberg: "The Biological Basis of Oral Malodor Formation"
12:15-12:45
W.J. Loesche: "Strategies to Identify the Main Microbial Contributors to Oral Malodor"
12:45-13:00
S. Goldberg: "Associations between Diamines and Oral Malodor"
13:00-13:30
Discussion

April 27th, 1993 (cont'd)

13:30-15:00	Lunch
15:00-16:15	**Session III: Population Studies** Chairperson: **S.J. Raven** 15:00-15:30 **H. Miyazaki**: "Oral Malodor and Oral Health Status in Japanese Population" 15:30-16:00 **M. Rosenberg**: "Bad Breath or Bad Breaths? Experiences of an Israeli Malodor Clinic" 16:00-16:15 Discussion
16:15-16:30	Coffee break
18:30	Bus leaves hotel for gala dinner at the Marcelle Gordon University Club (The "Green House" in Sheikh Munis)
19:00	Gala dinner sponsored by **Warner-Lambert Company**, at the Marcelle Gordon University Club Words of Welcome: **Prof. Dan Amir**, Rector, Tel Aviv University **Prof. Emanuel Marom**, Vice President and Dean for Research and Development, Tel Aviv University **Prof. Oded Sperling**, Dean, Sackler School of Medicine, Tel Aviv University **Prof. Haim Tal**, Head, The Maurice and Gabriela Goldschleger School of Dental Medicine, Tel Aviv University
23:00	Bus heads back for Daniel Hotel

Wednesday, April 28th, 1993

06:30-8:30 Breakfast

8:30-11:00 **Session IV: Periodontal Disease and Oral Malodor**
Chairperson: **D. van Steenberghe**
8:30-9:00
C.A.G. McCulloch: "Quantitative Associations between Periodontal Disease-Related Parameters and Oral Malodor
9:00-9:20
A. Kozlovsky: "Association between Periodontal Disease-Related Parameters and Oral Malodor"
9:20-9:30
Z. Ram: "Malodor Assessment in Periodontal Practice"
9:30-10:00
K. Yaegaki: "Periodontal Disease and Halitosis: Clinical and Biochemical Studies"
10:00-10:30
Discussion

10:30-11:00 Coffee Break

11:00-13:00 **Session V: Non-Oral Aspects of Oral Malodor**
Chairperson: **L. Ryan**
11:00-11:30
G. Preti: "Oral Malodor from Non-Oral Causes"
11:30-12:00
Y. Finkelstein: "Halitosis in Patients with Craniofacial Anomalies"

12:00-13:00
Round Table Discussion: "The Future of Malodor Research"

13:00-14:30 Lunch

14:30-16:15 **Session VI: Oral Malodor: The Human Factor**
Chairperson: **George Preti**
14:30-15:00
D. Lancet: "Molecular Genetics of Human Olfactory Perception"
15:00-15:30
R. Baht and **I. Eli**: "Psychological Factors in Self-Assessment of Oral Malodor"
15:30-16:00
Summary (**S. Dills**)

16:00-16:15 Coffee

Perception of odor mixtures

William S. Cain
John B. Pierce Laboratory and Yale University
New Haven, CT 06519, USA

Every applied problem of odor science, including oral malodor, involves the perception of odor mixtures. The question of how the perceived intensity, quality, and pleasantness of a mixture relates to the corresponding properties of the unmixed components nevertheless remains surprisingly primitive. At the threshold level, the limited data that exist imply an approximation to simple additivity of detection. Some data suggest that the more complex a mixture the more its detection will tend towards hyperadditivity. At the suprathreshold level, however, odor seems always to show hypoadditivity. A mixture will always smell less intense than the sum of its unmixed components. This phenomenon seems to derive from a fundamental nonlinearity in suprathreshold odor functioning. A corollary of the hypoadditivity and nonlinearity is that the perceived intensity of components in a mixture will show mutual weakening. When one focuses upon the intensity and quality of a particular component in a mixture, the hypoadditivity reflects itself as masking. Practical experience with masking suggests that some maskers are much more effective than others but there has been no theory to connect the various observations on the topic. Two hypotheses that we are currently considering is that minty substances may produce particularly good masking and that more complex substances may produce better masking than simple substances.

A Review of Advances In Mouth Odor Research

Hollandra P. Niles* and Abdul Gaffar,
Colgate-Palmolive Technology Center, Piscataway

It has previously been established that local mouth odor is caused by oral microorganisms reacting with proteinaceous materials in the mouth generating sulfur volatile compounds (VSC) such as H_2S and CH_3SH. Our studies indicated that VSC formation is not due to gram positive organisms but to the putrefactive action of gram negative organisms with the substrate.[1] We have also showed a strong correlation between H_2S production in gingival crevicular fluid vs gingival health in a human clinical study.[2]
An objective instrumental method had been developed, utilizing Gas Chromatography, to measure VSC directly from mouth air. [3]
This method showed a strong correlation with the sensory readings in a human clinical trial (r=0.78) and allowed for the development of a unique odor surpressing mouth rinse technology containing Zinc/alpha-ionone.
The instrumental method, although valuable for laboratory studies, is not conducive to off-site field trials. We have investigated a special mouth odor storage device which uses teflon loops for storing mouth air samples for subsequent analysis. The use of the storage device was validated in a human clinical study.[4] An approach has been developed to reduce VSC in humans on a sustained level using specific inhibitors. The data, from three clinical studies, will be reviewed showing long lasting odor protection with a rinse containing zinc and alpha-ionone.

1. Solis-Gaffar, M., Fischer, T. and Gaffar, A.: Instrumental evaluation of odor produced by specific oral microorganisams. J. Soc. Cosmet. Chem., 30, 241-2, July/ Aug. 1979

2. Solis-Gaffar, M., Rustogi, K., Gaffar, A.: Hydrogen sulfide production from gingival crevicular fluid. J. Periodontol. 51, 603-606, Oct. 1980.

3. Solis-Gaffar, M., Niles, H. P., et al.: Instrumental evaluation of mouth odor in a human clinical study. J. Dental Res. 54: 351-357, 1975.

4. Niles, H. P. , Gaffar, A.: Relationship between sensory and instrumental evaluations of mouth odor. J. Soc. Cosmet. Chem. (In Press)

A B S T R A C T

INSTRUMENTAL MEASUREMENT OF ORAL MALODOR

By

Dr. Manny Shaw, President, Interscan Corporation
Chatsworth, California

A clinical instrument, known as the Halimeter, Model RH-17C, is described in detail. Measurements of volatile sulfur compounds (VSC) require an instrument capable of detecting and quantifying oral malodor in the parts-per-billion range. In addition to meeting this requirement, the Halimeter is simple to operate, and relatively inexpensive compared to gas chromatography and other sophisticated laboratory instruments. Data will be presented describing actual oral measurements, and simulated oral measurements using accurately known levels of methyl mercaptan, hydrogen sulfide, and dimethyl sulfide. The usefulness of the Halimeter as a diagnostic tool is primarily dependent on the contribution of periodontists, and other professionals in oral malodor studies, in extending the technique of using the Halimeter, and interpreting the data from a clinical viewpoint.

I. Kleinberg, SUNY at Stony Brook

Biological basis of oral malodor formation.

This presentation will develop the thesis that excessive oral putrefaction is the underlying basis of oral malodor formation and will deal with the main elements involved. Putrefaction consists of two fundamental processes. One is the provision of amino acids by the hydrolysis of proteins and peptides (proteolysis); the other is the degradation of these amino acids to various end-products (aminolysis) some of which are odoriferous. An extensive survey in our laboratory to identify the bacteria and amino acids responsible for odoriferous compound formation confirmed the involvement of the Gram-negative bacteria and the sulphur-containing amino acids, cysteine, cystine and methionine. However, the survey also showed that, of all of the major Gram-negatives found in the mouth, Neisseria were not involved and several other amino acids contributed. Fusobacteria and Bacteroides were confirmed as mainly responsible but Haemophilus and Veillonella also favored odor formation. In addition to the sulphur-containing amino acids, tryptophan and ornithine favored odor formation with some from arginine, a possible precursor of ornithine in some bacteria. The roles of epithelial cells, saliva and the physico-chemical parameters of pH, PO_2, and E_h have also been considered. These showed that epithelial cells were likely to be involved in situ but were not essential, that saliva has a marked stimulatory effect, that malodor occurs at neutral and alkaline pH and is inhibited by acidity, and that oxygen depleted conditions are more conducive to malodor formation as is a lower E_h. Saliva, mainly through its urea content favors alkalinity, mainly through its proline and glutamate content favors oxygen depletion and probably through its cysteine and cysteine constituents favors a lowered E_h. It is evident that amino acid catabolism by the oral bacteria is complex but its understanding is evidently key to the elucidation of oral putrefaction mechanisms and the formation of oral malodor.

W.J. Loesche, University of Michigan

Abstract of Presentation at Oral Malodor Workshop

Oral malodor arises primarily from microbial fermentation of proteinacious substrates that occurs locally in the oral cavity. The microbial flora on the tongue and in the dental plaque contain organisms capable of producing both volatile fatty acids and mercaptans from proteins, peptides and various glycoproteins. The tongue flora appears to be responsible for the majority of the malodor, with an additional contribution coming from the plaque, if there is poor oral hygiene and periodontal disease. In cases involving periodontal disease, the main microbial contributors to the malodor are the anaerobic organisms belonging to the following genera: *Treponema, Porphyromonas, Prevotella, Fusobacterium* among others. Treatment of the periodontal condition results in improvement of the malodor problem. However, the greatest and most frequent contributor to oral malodor are the organisms resident on the tongue. In microbiological terms, the tongue is the great unknown, as very few studies of its indigenous flora have been performed. We do not have any consensus as to the best way to remove samples from the tongue surface in order to perform detailed quantitative analysis. Our initial efforts at using a quantitative serial dilution anaerobic procedure that was adequate for the characterization of either the supragingival or subgingival flora has revealed that about 95% of the isolates are unknown to us. We are resolving this dilemma by resorting to a strategy of determining the levels of organisms that occupy various niches in the flora. For instance, we are determining the ratio of asaccharolytic to saccharolytic flora on the premise that asaccharolytic organisms will be more likely to produce volatile mercaptans and fatty acids. Likewise, we are determining the anaerobic to facultative ratio and the levels of organisms that can grow on a mucin containing medium, and a low pH medium. In this way, we hope to be able to associate various segments of the tongue flora with complains of oral malodor. Once a segment is identified then we will focus attention on identifying specific organisms. Preliminary data using this approach will be presented.

Associations Between Diamines and Oral Malodor

S. GOLDBERG, A. KOZLOVSKY, D. GORDON, I.GELERNTER,A. SINTOV[4], and M. ROSENBERG

Whereas previous studies have shown correlations between volatile sulphur compounds (VSC) and bad breath levels, it is probable that other components contribute to oral malodor. In the present investigation, the possibility that diamines (cadaverine and putrescine) are associated with oral malodor parameters was assessed. Saliva samples from 51 subjects were analyzed for diamines, by HPLC. Oral malodor of whole mouth, tongue and saliva was recorded by an experienced judge on a continuous 10 cm scale. Peak and steady-state VSC levels were measured using the Interscan 1170 sulphide monitor. Log-transformed VSC and diamine levels were compared with organoleptic measurements using Pearson analysis, and stepwise multiple regression. Putrescine scores were not significantly associated with organoleptic paramteres, nor with VSC levels ($p>0.1$). However, highly significant correlations ($p<0.001$) were found between cadaverine levels and all three odor judge assessments. In contrast, associations between cadaverine and VSC measurements were nonsignificant. Stepwise multiple regression of odor judge results in terms of VSC and diamines showed that both VSC and cadaverine factor signficantly in explaining each of the odor judge measurements, with multiple r values ranging from 0.545 ($p<0.0001$) to 0.604 ($p<0.0001$). In vitro experiments carried out with saliva samples inoculated into decarboxylase medium, showed increased cadaverine production over time which was concomitant with odor production. The results suggest that cadaverine levels are associated with oral malodor, and that this association may be independent of VSC.

Oral Malodor and Oral Health Status in Japanese Population.

H. MIYAZAKI*, S. SAKAO, Y. KATOH and T. TAKEHARA
(Department of Preventive Dentistry, Kyushu Dental College, Japan):

The purpose of this survey is to ascertain basic data on oral malodor in Japanese population and also the relationship between oral malodor and oral health status. 2,601 people aged 18 to 64 years who lived in Fukuoka Prefecture, Japan were measured oral malodor using a portable sulfide monitor (Interscan Corp., Model RH17A, Chatsworth CA) by two dentists, and they were assessed their dental (DMF) and periodontal conditions (PMA, CPITN and attachment loss), dental plaque and tongue coating status by four dentists. Interviews for subjects were also conducted about their oral health behavior, smoking habits and medical history before clinical examinations. Calibration among examiners was carried out before and during actual survey using volunteer dental students and dental patients in the college hospital. Intra- and inter-examiner reliabilities were confirmed by Kappa statistics. Subjects were divided into four groups by measuring period as following that; the period 1) within and 2) over 2.5 hours after oral activities in the morning (M 2.5h> and M 2.5h<, respectively) and 3) within and 4) over 2.5 hours after oral activities in the afternoon (A 2.5h> and A 2.5h<, respectively). And data were analyzed by sex and age group. In each sex and age group, the measurement values of oral malodor showed highest in the groups of M 2.5h< (61.0 ppb in average), followed A 2.5h< (54.8 ppb) and lowest were shown in the groups of A 2.5> (41.6 ppb). When compared between age groups by four different measurement period, the values tended to increase with increasing age in both males and females in each measurement period, especially within 2.5 hours after lunch (A 2.5h>). Statistical significant correlation were observed between oral malodor and periodontal conditions and tongue coating status. However, there were no significant correlation between oral malodor and DMF, plaque, smoking habits, and self-diagnosis. In conclusion, these results suggest that oral malodor might be caused mainly by tongue coating in younger generation and by periodontal diseases together with tongue coating in older cohorts in Japan.

Bad Breath or Bad Breaths? Experiences of a Malodor Clinic

Mel Rosenberg and Efrat Leib, Tel Aviv University and Basel Heights Medical Center, Tel Aviv, Israel

During the last ten months of 1992, 317 subjects (60% female) with a complaint of bad breath were assessed in a private clinic for malodor consultation. The consultation included (i) an interview regarding general health, oral hygiene practices, history of the complaint, and how the subjects see the problem of oral malodor as affecting their lives; (ii) organoleptic scoring by two judges (on a 0-5 scale) of whole mouth malodor, malodor of anterior and posterior of tongue dorsum, and nasal malodor; and (iii) volatile sulphide measurement with the Interscan 1170 sulphide monitor. Among 93 women asked to grade their own malodor on a scale of 0-5, prior to measurement, 29% scored themselves as a "5", whereas they were scored by the judges as having malodor in the 0-3.5 range. Comments regarding the effect of oral malodor on one's life included such statements as "It ruins my life", "I feel defiled", and "I sleep separately from my husband. Two reported suicidal tendencies. One subject likened her oral malodor to "cancer". Such observations underly the need to establish methods to address the subjective fear of having bad breath ("halitophobia") as well as objective and diagnostic techniques for estimating the intensity of the odor and its origins.

Among the subjects, four types of malodor were found to be recurrent and readily distinguishable from one another: odor resembling the smell of subgingival putrefaction, odor from the anterior and posterior of the tongue dorsum, respectively, and odor from nasal passages. Other types of odors (e.g., denture breath, smoker's breath, unidentified odors) were relatively rare. This experience suggests that when conducting clinical studies on oral malodor (e.g. to measure efficacy of a treatment), the quality, as well as the intensity of malodor should be determined.

C.A.G. McCulloch, University of Toronto

Abstract

There are numerous reports indicating a strong relationship between oral malodour production and presence of periodontal infections. We have quantified this relationship in a cross-sectional study in 127 subjects using volatile sulphur measurements, organoleptic assessments and standardized methods for clinical detection of periodontal health. Replicate measurements of volatile suphur-containing compounds were reproducible and were correlated with organoleptic measurements. Dichotomous measures of periodontitis/no periodontitis and the presence or absence of oral malodour based on organoleptic scores above a threshold indicated that there was no measureable relationship between periodontitis and oral malodour (odds ratio=1.2). Organoleptic measurements of the tongue demonstrated that a large proportion of subjects with oral malodour but without periodontitis exhibited high odour levels on the tongue and that these sites were also associated with BANA-positive enzyme activity. Collectively, these findings indicate that the tongue as well as dental sites are important contributors to oral malodour production and raise questions on the validity of oral malodour as a potentially useful screening test for periodontitis.

ASSOCIATION BETWEEN PERIODONTAL DISEASE-RELATED PARAMETERS AND ORAL MALODOR

A. KOZLOVSKY*, D. GORDON, I. GELERNTER and M. ROSENBERG
Tel-Aviv University, Tel-Aviv, ISRAEL

The purpose of the present investigation was to test the association between periodontal disease-related parameters (PI, GI, and probing depth) vs. oral malodor parameters. The subject population consisted of 52 Israeli adults, 43 of whom complained of oral malodor. Mean plaque and gingival indices were 1.2 ± 0.5 and 1.1 ± 0.4, respectively. Mean probing depth (n=30) was 2.9 ± 0.7. Oral malodor measurements consisted of log-transformed peak and steady-state volatile sulphide measurement using a portable sulphide monitor (Interscan Corp., model 1170), as well as organoleptic measurements of malodor from whole mouth, tongue and saliva, registered on a continuous 10 cm scale. Probing depth was significantly associated with both volatile sulphide parameters, as well as odor judge scores. GI was highly significantly associated ($p<0.001$) with all three organoleptic scores. PI was associated with odor judge assessments, but not with monitor results. The results suggest that the dental and malodor-associated parameters in the population studied are significantly associated .

Zeev Ram, Periodontist, Rehovot, Israel

Malodor Assessment in Periodontal Practice

Previous investigations have shown associations between periodontal diseases and oral malodor. Chemical treatments (e.g., mouthwashes) and tongue brushing have been shown to reduce malodor, concomitant with reductions in dental-associated parameters. However, the effect of standard periodontal treatment (i.e., initial preparation) on oral malodor has not been sufficiently assessed. In the present study, 47 patients, attending a private periodontal practice were assessed for volatile sulphide levels, prior to and following initial preparation. Volatile sulphides were assessed using a digital halimeter (Interscan Corp.), fitted with a plastic straw inserted into the center of the oral cavity, with the patient closing his mouth over the straw, but within lips. and recorded as log peak ppb sulphide equivalents. Initial preparation consisted of deep scaling and root planing (both employing only a Cavitron Ultrasonic Scaler™), as well as oral hygiene instruction, emphasizing use of the Perio-Aid with round ended toothpicks. Tongue brushing was not taught. A highly significant reduction in volatile sulphides ($p<0.001$, paired t-test) was found following initial preparation, as compared to prior to treatment, corresponding to an overall reduction of 35%. The results suggest that initial preparation results in a significant decrease in oral malodor levels.

ABSTRACT

Oral Malodor from Non-Oral Causes. G. Preti[1,2], H.J. Lawley[1], C. Hormann[1], B. Cowart[1,3], R. Feldman[4], I.M. Young[3] and L.D. Lowry[3]. [1]Monell Chemical Senses Center, [2]Department of Dermatology, University of PA; [3]Department of Otolaryngology, Jefferson Medical College; [4]Dental Service, Veterans Affairs Medical Center, Philadelphia, PA.

Research in my laboratory has centered on the nature and abundance of odors produced by humans. Knowledge gained in these studies has enabled us to apply our instrumental techniques to patients presenting to our Chemosensory Clinical Research Center with persistent, idiopathic complaints of dysosmia/dysgeusia and oral malodor. Many have had their symptoms for a number of years. In the past three years, we have evaluated fifty-two such patients. Seventeen (33%) have been found to be suffering from trimethylaminuria (TMAU). TMAU is thought to be a rare, autosomal recessive disorder characterized by elevated levels of trimethylamine (TMA) in body fluids; however, it appears to be a frequent cause for oral complaints (including "bad breath") in our referred patient population. Several TMAU positive patients had levels of other odorous volatile organic compounds above those in normal controls; however, no consistent pattern was found. Initial analyses suggest that high levels of salivary TMA in the TMAU sufferers may be responsible for their persistent dysosmia/dysgeusia symptoms. In contrast, patients presenting with persistent oral symptoms but not diagnosed as TMAU positive had higher levels of volatile sulfur compounds than normal controls in their mouth and lung air samples. In several instances, this production could be linked to both non-oral and/or oral causes. Although some two dozen cases of TMAU have been reported since 1970, none have commented on its oral symptoms; however, the number of cases we have diagnosed (17) suggests a wider distribution of the disorder than previously thought and oral presentation of bad odor/taste, as a motivating factor in having the patient seek relief for the etiology of their symptoms.

Halitosis in Patients with Craniofacial Anomalies

Y. Finkelstein, Ari DeRowe, S. Calderon* and D. Ophir

Dept. of Otolaryngoly, Head and Neck Surgery, Meir Hospital, Kfar Saba, and Dept. of Maxillofacial Surgery*, Beilinson Med. Ctr., Petah-Tiqva, and Sackler School of Medicine, Tel-Aviv University, Tel-Aviv, Israel

Halitosis in patients with craniofacial anomalies merits special attention. In general, due to various malformations of the intranasal structures, chronic paranasal sinusitis leading to halitosis is observed more frequently than in the normal population. Poor dental status is also more frequent in cleft palate patients, and thus may be an additional cause of halitosis in these patients. In the present paper, we describe three patients who suffered from halitosis associated with unusual presenting pathologies. In one case, during preparation for dental reconstruction, dental impression material was injected into the soft tissue filling the palatal cleft, through the maxillary sinus floor. This caused purulent sinusitis accompanied by severe halitosis for two years. In another case, a patient with cleft palate suffered from halitosis for over a year following pharyngeal flap surgery. The malodor resulted from a putrid gauze pad which was left during surgery within the nasopharynx above the pharyngeal flap. The pharyngeal flap occluded the nasopharynx from below, impeding perioroal examination of the nasopharyngeal space. The putrid gauze was found and immediately removed by a transnasal endoscopic procedure. Finally, a young patient who suffered for several years from halitosis was found to have an ectopic tooth in his nasal floor. Extraction of the tooth was followed by disappearance of the presenting malodor. In summary, patients with craniofacial anomalies, particularly cleft palate patients, who complain of malodor, should be subjected to a vigorous evaluation, including a thorough endoscopic examination.

The Olfactory Receptor Gene Cluster on Human Chromosome 17: Genetic Diversity and Implications to Odor Recognition Polymorphisms. DORON LANCET[1], MICHAEL NORTH[2], MIRIAM KHEN[1], HANS LEHRACH[2] AND NISSIM BEN-ARIE[1], ([1]Department of Membrane Research and Biophysics, the Weizmann Institute of Science, Rehovot 76100, Israel; [2]Department of genome Analysis, ICRF, Lincoln's Inn Fields London WC2A 3PX, England).

The unique ability of the olfactory system to discriminate millions of odorants is based on several hundred G-protein-coupled olfactory receptors (ORs). The ~1000bp intronless OR coding regions form clusters on several chromosomes, totally occupying a 5-10Mb "olfactory sub-genome". The large genetic variability of human olfactory thresholds (including specific anosmia - the inability to smell an odorant) implies that many receptor alleles occur at each locus. Thus, the overall polymorphism of ORs may be much greater than that of histocompatibility antigens.

We isolated 75 human chromosome 17 cosmids, each containing 1-3 OR genes. All appear to be clustered at 17p13.3. A strategy based on PCR, sequencing and CA repeat mapping is employed to identify inter-individual genomic differences and assess the extent of OR genetic polymorphism. In parallel, individuals are screened psychophysically for olfactory threshold variance for numerous odorants. We hope to identify odorant specificities of some chromosome 17 ORs, and help establish the molecular basis of human olfactory diversity.

Presenter: Prof. Doron Lancet
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Psychopathologic Trends in Patients Complaining of Oral Malodor

Ilana Eli, Roni Baht and Mel Rosenberg, Tel Aviv University

Halitosis is a common problem affecting a large segment of the population. In some cases subjects may complain of severe halitosis, although no objectionable odor is observed. The psychological factors which may lead to this phenomenon are not well characterized. In the present report, a psychopathologic evaluation was carried out on 35 subjects (68% female, mean age=38) who arrived with a complaint of oral malodor to a multidisciplinary team formed to evaluate various aspects of the problem. Patients were requested to evaluate their own malodor on a continuous 10 cm scale in three manners: (i) by cupping hands over their mouth and nose (whole mouth malodor); (ii) by licking their wrist; and (iii) by smelling their own saliva, following expectoration into a petri dish. They were subsequently requested to give an assessment of the degree of their oral malodor (conception). Subjects were also requested to fill out the SCL-90 questionnaire developed by Derogatis et al. (1973) as a general measure of psychopathology in clinical settings. The clinical profile of each subject was computed according to the following SCL-90 dimensions: somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism.

The results show elevated levels in all SCL-90 categories for the experimental population, as compared to a control group of dental patients who arrived for routine dental treatment in an associated University clinic. Particularly high scores were observed in the categories of obsession and interpersonal sensitivity. Furthermore, significant correlations were found between the subjects' SCL-90 scores and their whole mouth as well as conception assessments. No such correlations were found for the subjects' assessment of their own saliva. The results suggest that the subjective self perception of oral malodor is affected by psychopathological trends, which may be testable using the SCL-90 questionnaire. We propose that self-perception of halitosis in such subjects is intimately associated with the smell being perceived as part of the body image. Thus, once the odor is physically removed from the body (i.e., in the case of saliva), an increasingly objective self-assessment is possible.